

CLAIMS

1. A component feeder (4) for feeding, from a wafer feeding plate (6w) on which a wafer (7) having a plurality of wafer feed components (2w) is placed and a tray feeding plate (6t) on which a component feeding tray (57) having a plurality of tray feed components (2t) is placed, out of components (2, 2w, 2t) to be mounted on a board, the wafer feed components and the tray feed components while allowing the components to be mounted,

10 the component feeder comprising a plate placing device (12) for which selectively placing and holding either plate of the plates (6, 6w, 6t) and allowing the wafer feed component or the tray feed component to be fed from the wafer or the component feeding tray, respectively,
15 and

 the plate placing device serving for placing and holding the plate so that a feeding height of the wafer feed component on the wafer feeding plate and a feeding height of the tray feed component on the tray feeding plate
20 become approximately equal to each other.

2. The component feeder as defined in claim 1, wherein
 the plate placing device comprises:
 an elastic support member (60, 65), which is able to support the placed plate from a lower surface side in a
25 vicinity of its outer peripheral portion and of which

support height position is variable;

a plate pressurizing member (61) for holding the plate by pressurizing the plate supported by the elastic support member from an upper surface side of the plate in the vicinity of the outer peripheral portion so that the plate is held between the plate pressurizing member and the elastic support member; and

a pressurizing member elevating unit (62) for moving up and down the plate pressurizing member, and

the pressurizing member elevating unit moves up and down the plate pressurizing member to vary the support height position of the elastic support member so that the feeding height of the wafer feed component on the wafer feeding plate and the feeding height of the tray feed component on the tray feeding plate, being supported by the elastic support member become approximately equal to each other.

3. The component feeder as defined in claim 2, wherein

the plate placing device further comprises a regulation part (69) for selectively regulating a position in which the plate pressurizing member is lowered by the pressurizing member elevating unit, and

the position in which the plate pressurizing member is lowered is regulated by the regulation part so that the feeding height of the tray feed component becomes

approximately equal to the feeding height of the wafer feed component when the tray feeding plate is placed on the plate placing device.

4. A component feeder (4) for feeding, from a wafer feeding plate (6w) on which a wafer (7) having a plurality of wafer feed components (2w) is arranged and a tray feeding plate (6t) on which a component feeding tray (57) having a plurality of tray feed components (2t) is arranged, out of components (2, 2w, 2t) to be mounted on a board, the wafer feed components and the tray feed components while allowing the components to be mounted,

the component feeder comprising:

a plate receiving part (10) for receiving the plurality of wafer feeding plates and the plurality of tray feeding plates while allowing the plates to be discharged;

a plate placing device (12) for selectively placing and holding either plate of the plates (6, 6w, 6t) and allowing the wafer feed component or the tray feed component to be fed from the wafer or the component feeding tray, respectively; and

a plate moving device (40) for releasably holding the plate, discharging the plate from the plate receiving part, and moving the plate while allowing the plate to be held by the plate placing device, and

the plate placing device comprising:

a plurality of elastic support members (60, 65), which are able to support the placed plate from a lower surface side in a vicinity of its outer peripheral portion and of which support height positions are variable;

5 a plate pressurizing member (61) for holding the plate by pressurizing the plate supported by the elastic support members from an upper surface side in the vicinity of the outer peripheral portion so that the plate is held between the plate pressurizing member and the elastic
10 support members; and

 a pressurizing member elevating unit (62) for moving up and down the plate pressurizing member; and

 a regulation part (69) for selectively regulating a position in which the plate pressurizing member is
15 lowered by the pressurizing member elevating unit,

 wherein the support height of the tray feeding plate by the elastic support members can be held by regulating the position where the plate pressurizing member is lowered by the regulation part when the tray feeding
20 plate is placed on the plate placing device, and

 when the wafer feeding plate is placed on the plate placing device, the wafer placed on the wafer feeding plate can be expanded by releasing regulation of the lowered position by the regulation part and lowering the
25 plate pressurizing member by the pressurizing member

elevating unit while supporting the wafer feeding plate by the elastic support members.

5. The component feeder as defined in claim 4, wherein the wafer feeding plate comprises:

5 a wafer sheet (8) to which the wafer that has undergone dicing adheres; and

a wafer ring (9), which is an annular plate and holds the wafer sheet so that the wafer is positioned inside thereof,

10 the plate placing device further comprises an expanding member (63) that has an annular contact portion (63a) capable of coming in contact with a lower surface of the wafer sheet between an outer periphery of the wafer and an inner periphery of the wafer ring at the wafer feeding
15 plate in a state in which the wafer ring is supported by the elastic support members, and

the wafer can be expanded by radially expanding the wafer sheet by lowering the plate pressurizing member by the pressurizing member elevating unit using the annular
20 contact portion of the expanding member as a fulcrum and thus depressing the wafer ring.

6. The component feeder as defined in claim 4, wherein the plate moving device comprises:

a holding part (41) for releasably holding the
25 plate;

a holding part moving unit (44) for moving the holding part so as to move the plate held by the holding part from the plate receiving part to the plate placing device; and

5 a plate identifying part (41b) for identifying whether the held plate is the wafer feeding plate or the tray feeding plate based on a configuration of the holding part of the plate, and

10 the regulation part of the plate placing device regulates the position where the plate pressurizing member is lowered based on an identification result of the plate identifying part.

7. The component feeder as defined in claim 5, wherein

the tray feeding plate comprises:

15 a tray placing part (58), on which a plurality of the component feeding trays are detachably placed; and

 a tray ring (59), which is an annular plate formed at a periphery of the tray placing part, and

20 the plate placing device is able to support the tray ring by the elastic support members and hold the tray feeding plate by holding and pressurizing the tray ring between the plate pressurizing member and the elastic support members, and the regulation part regulates the position where the plate pressurizing member is lowered by
25 the pressurizing member elevating unit so that a lower

surface of the tray feeding plate does not come in contact with the expanding member.

8. The component feeder as defined in claim 7, wherein the tray placing part comprises:

5 a fixed side holding member (81), which is able to come in contact with one end portion of a roughly quadrangle configuration of the component feeding tray that has the roughly quadrangle shape in plan; and

movable side holding members (80 and 80a, 80 and 10 80b), which are able to come in contact with an end portion opposite to the one end portion of the component feeding tray in a state in which the one end portion is brought in contact with the fixed side holding member and allows the opposite end portion to be movably urged toward the fixed 15 side holding member, and

a placement position of the component feeding tray in the tray placing part is held so as to hold the component feeding tray by the fixed side holding member and the movable side holding members.

20 9. The component feeder as defined in claim 4, wherein

at least one elastic support member (65) of the plurality of elastic support members has a slant end portion (65a), which has its end portion come in contact with the end portion of the supported plate, thereby 25 regulating a support position in a direction along a

surface of the plate.

10. The component feeder as defined in claim 4, wherein
the regulation part comprises:

5 a contact portion (69a), which is able to come in
contact with a lower portion (61a) of the plate
pressurizing member and regulate the position where the
plate pressurizing member is lowered by the contact; and

a contact portion moving mechanism (69b) for
moving the contact portion between a contact position where
10 the contact portion is come in contact with the plate
pressurizing member and a retreat position where the
contact portion is retreated.

11. The component feeder as defined in claim 4, wherein

the pressurizing member elevating unit of the
15 plate placing device comprises:

a cylinder portion (71) for moving up or down the
plate pressurizing member by supplying or discharging
compressed air;

20 an elevation compressed air supplying part (73),
which is able to supply elevation compressed air for
performing the upward or downward movement as the
compressed air to the cylinder portion;

a retention compressed air supplying part (74),
which has a pressure lower than that of the elevation
25 compressed air and is able to supply retention compressed

air for retaining a stop position of the plate pressurizing member when the plate pressurizing member stops moving up or down as the compressed air to the cylinder portion; and

5 a compressed air selection valve (70) for selectively supplying the elevation compressed air or the retention compressed air to the cylinder portion.

12. The component feeder as defined in claim 11, wherein

10 the compressed air selection valve is a mechanical lock valve (70), which is able to detect an upper end position of elevation of the plate pressurizing member by mechanically coming in contact with the plate pressurizing member, for selectively supplying the retention compressed air to the cylinder portion in place of the elevation compressed air when the upper end position
15 is detected.

13. The component feeder as defined in claim 6, wherein

the plate receiving part comprises:

a receiver (50) for receiving the plates in a stack; and

20 a receiver elevating unit (51) for positioning one plate of the plates received in the receiver into an elevation height position in which the plate can be held by the holding portion of the plate moving device by moving up and down the receiver, and

25 the plate placing device comprises:

an openable jump preventing plate (84, 86), which has a plate outlet portion (84a, 86a) that allows the one held plate together with the holding part to pass therethrough, and a plate regulation part, which is formed at a periphery of the outlet portion and is able to prevent the plates that are other than the one plate and are received in the receiver of the plate receiving part from jumping out of the receiver.

14. The component feeder as defined in claim 13, wherein

the plate placing device further comprises a jump detecting unit (85), which is able to detect the plate located in the outlet portion of the jump preventing plate.

15. The component feeder as defined in claim 4, wherein

the plate receiving part comprises:

a base (52) for supporting the receiver and the receiver elevating unit; and

a base retention part (91), which has a linear motion guide portion (93) that can retain a position where the base is placed, for guiding a linear motion of the base by releasing the retention, and a pivot guide portion (94) for guiding a rotational motion of the base, and

the base comprises an engagement portion (92), which can be selectively engaged with the linear motion guide portion and the pivot guide portion,

the base can be linearly moved by engaging the

engagement portion with the linear motion guide portion,
and

the base can be moved while rotating by releasing
the engagement between the engagement portion and the
5 linear motion guide portion and engaging the engagement
portion with the pivot guide portion.

16. The component feeder as defined in claim 4,
wherein

the receiver of the plate receiving part
10 comprises a plurality of sets of support guide portions
(250b) for individually supporting mutually opposed each
end portions of each of the plates, which are arranged
mutually opposed to guide a movement in a direction along a
surface of the plate in discharging each of the plates, and

15 wherein a contact portion (R) to each support
guide portion of each of the plates has a smooth surface
portion (59a).

17. The component feeder as defined in claim 16, wherein

a slant portion (250e, 250f) with respect to a
20 movement direction is formed at an insertion end portion
(250d) of the support guide portions of the each set while
enabling correction of positional deviation between an
insertion position of each of the plates to the support
guide portions of the each set in a direction roughly
25 perpendicular to the movement direction (C) of each of the

plates and a support position of the support guide portions of the each set.

18. The component feeder as defined in claim 16 or 17, wherein

5 contact surfaces between each of the plates and the support guide portions are formed so that a hardness of the contact surface of the support guide portion is smaller than that of the plate.

10 19. The component feeder as defined in claim 16 or 17, wherein

 contact surfaces between each of the plates and the support guide portions are formed so that a hardness of the contact surface of the plate is smaller than that of the support guide portion.

15 20. The component feeder as defined in claim 16 or 17, wherein

 the support guide portions comprise roller portions (261a) rotatable along a surface of the end portion while supporting the end portion of each of the
20 plates.

21. The component feeder as defined in claim 4, wherein

 the plate pressurizing member has a lower surface further comprising:

 a plurality of support members (261b) for
25 supporting the plate fed to the plate placing device while

allowing the plate to be discharged; and

a plurality of urging members (261c) for consistently urging the plate against the support members or the elastic support members regardless of the position
5 where the plate pressurizing member is lowered by the pressurizing member elevating unit.

22. The component feeder as defined in claim 21, wherein

each of the urging members comprise an urging roller portion (262) rotatable along a surface of the plate
10 while urging the plate supported by the support members to allow the plate to be moved by the plate moving device.

23. The component feeder as defined in claim 6, wherein

each of the plates has an engagement portion (291) capable of being engaged with the holding part (241)
15 in a holding position on the upper surface side of the plate by the holding part.

24. The component feeder as defined in claim 16, wherein

the receiver further comprises a plurality of posture guide portions (490, 590) for guiding a support
20 posture in a horizontal direction of each of the plates by being arranged between the sets of the support guide portions and being engaged with each of the plates.

25. The component feeder as defined in claim 24, wherein

the receiver has an openable and closable cover
25 portion (550c) for replacing each of the plates, and the

posture guide portions are provided inside the cover portion.

26. The component feeder as defined in claim 25, wherein
the receiver comprises an open/close detection
5 sensor (580) for detecting opening or closing of the cover
portion.

27. The component feeder as defined in claim 15, wherein
the receiver comprises a plurality of fixing
parts (471) for fixing the support to a support surface of
10 the base, and at least one of the fixing parts is formed of
a conductive material having a function as a ground
terminal portion.